

**THE ROLE OF SUPPLY, DEMAND  
AND FINANCIAL COMMODITY MARKETS  
IN THE NATURAL GAS PRICE SPIRAL**

**Prepared for**

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# EXECUTIVE SUMMARY

## BACKGROUND CONTEXT OF THE STUDY

This report examines the factors underlying the recent upward spiral of natural gas prices. It paints a very different picture than the one we frequently see on television, read in the press or hear in testimony at legislative or regulatory proceedings. The easiest way for all parties to avoid responsibility is to blame tightness in the physical market and invoke Mother Nature – the weather and geology:

- Demand is soaring or skyrocketing.
- Supply is constrained by nature and public policy.
- Financial markets send efficient price signals to balance supply and demand.

This is a simple story, which is often repeated because it is easy to sell; **unfortunately, it is, at best, half true.**

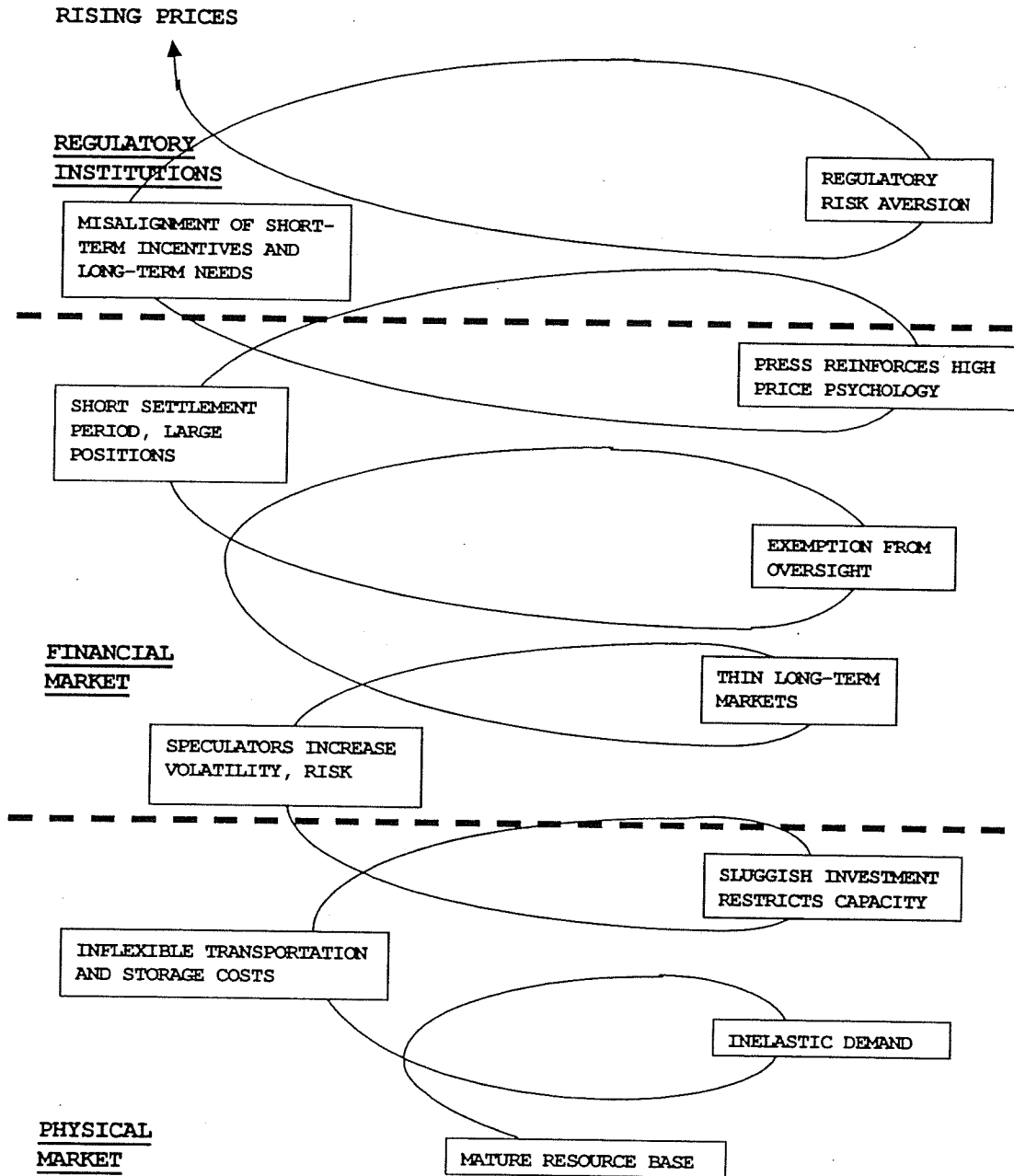
The reality is much more complex (see Exhibit ES-1). Many factors in natural gas physical and financial markets have interacted in an upward spiral to raise natural gas prices to far higher levels than they should be. Although the simple explanation/excuse is easy to tell, the more complex story is just too important not to tell. The frenetic, upward spiral of natural gas prices deeply affects household budgets and economic activity. Consider the following:

- The wellhead price of natural gas in the six-year period of 2000-2005 increased by over **\$400 billion dollars** compared to the previous six years.
- Winter heating bills in the Midwest this winter are projected to be up by **\$250 per household**, or 28 percent, compared to last winter, despite a 5 percent decline in consumption. They are up by over **\$600** compared to five years ago.

If we do not look behind the half-truth, half-hype smokescreen of the headlines, consumers will continue to pay a lot more for natural gas than they should. The public discussion must be expanded to include the other factors that have been powering the upward ratchet of natural gas prices since the start of the 21<sup>st</sup> century. We must do this not simply because high prices are harmful, but also because specific policy mistakes made in the past have helped to cause the current problems. There are policy measures that can and should be taken in the future to reduce the upward spiral.

Beyond the staggering sums at stake, two fundamental observations provide the background for this analysis:

EXHIBIT ES-1: CAUSES OF SPIRALING NATURAL GAS PRICES



First, the widespread reliance on natural gas commodity markets to set the price paid by consumers is an extremely recent phenomenon, just over 15 years old. As evidenced by the wild, irrational swings in natural gas prices, these new markets have not worked very well. They are deemed to be 'inefficient' in technical academic studies and have a history of manipulation, abuse and misreporting.

Second, natural gas has supply and demand characteristics that make it vulnerable to abuse and volatility, yet the markets in which wholesale natural gas prices are set are less regulated than many other commodity markets. Many in the industry believe these markets lack transparency and are vulnerable to abuse and manipulation. Regulators have failed to lay these concerns to rest because the vast majority of gas trading is subject to little monitoring or oversight. While regulators and policymakers have been scrambling to reform the market rules for this commodity, they have yet to impose comprehensive oversight and accountability.

Physical market fundamentals – a tight supply/demand balance – are not adequate to explain either the short-term or long-term behavior of natural gas prices. This does not mean that tight markets do not matter – of course they do – but identifying physical market fundamentals is only the beginning of the story, not the end.

- Tight markets reflect public policies and strategic behaviors, not just Mother Nature. To the extent that Mother Nature is a wild card, policymakers can and should create systems that are less vulnerable and better able to mitigate the impact of supply shocks.
- Natural gas commodity markets have exhibited erratic behavior and a massive increase in trading that contributes to both volatility and the upward trend in prices. The rules can be changed to moderate these effects.
- The incentive structures and distribution of bargaining power in the physical and financial markets for natural gas are unnecessarily tilted against the consumer. Public policy can and should ensure a better balance.

When we look for answers, we end up in Washington, D.C., where jurisdiction over the interstate natural gas system at issue resides. All of the major determinants of the wildly fluctuating price of natural gas in recent years – the physical (wellhead and pipeline) markets and the financial commodity markets – are under federal authority, but policy makers have failed to take the steps necessary to protect the public.

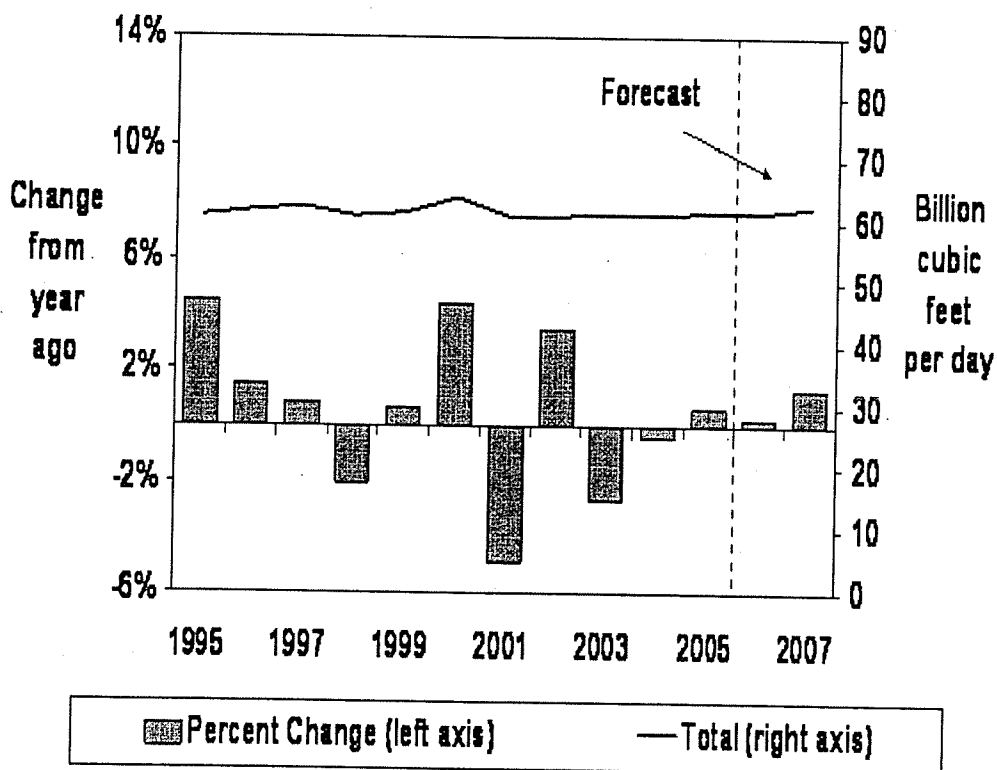
## **PHYSICAL MARKET FUNDAMENTALS**

The long-term fundamentals of supply and demand do not support the current high price of gas.

- Demand has not been “surging,” “soaring” or “skyrocketing,” as is frequently reported in the press (see Exhibit ES-2). Over the past ten years it has been relatively flat, with a slight moderation of the winter peak. Over the past three years, it has declined slightly.

## EXHIBIT ES-2: NATURAL GAS DEMAND: 1995-2005

Figure 12. Total U.S. Natural Gas Demand Growth



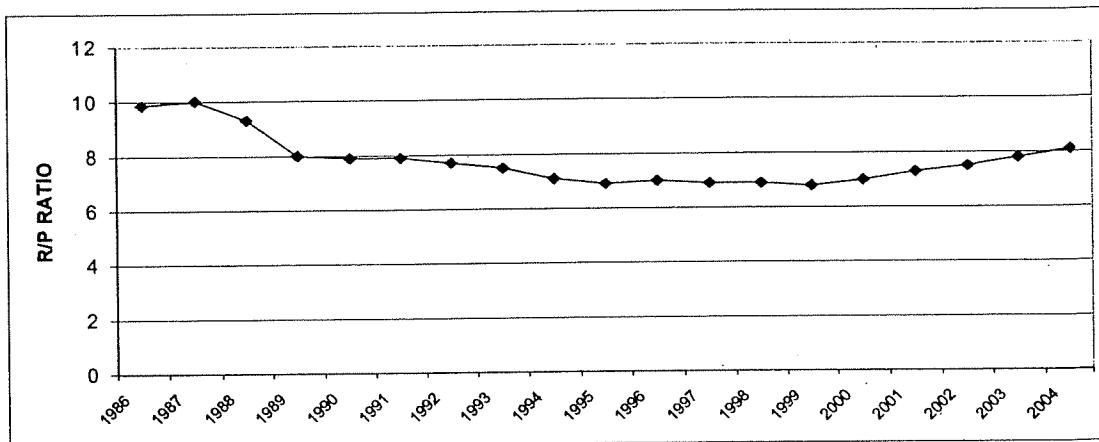
Short-Term Energy Outlook, January 2006



- Although supply reserves were drawn down in the late 1980s and 1990s and have become harder to find, in recent years reserve additions have been growing (see Exhibit ES-3). The reserve-to-production ratio has been increasing for the past six years.
- The long run cost of producing gas (even when using the high-end estimate of such cost) is far below the current price being paid.

Short-term conditions of supply and demand also do not support the current high price of gas:

### EXHIBIT ES-3: NATURAL GAS RESERVE TO PRODUCTION RATIO

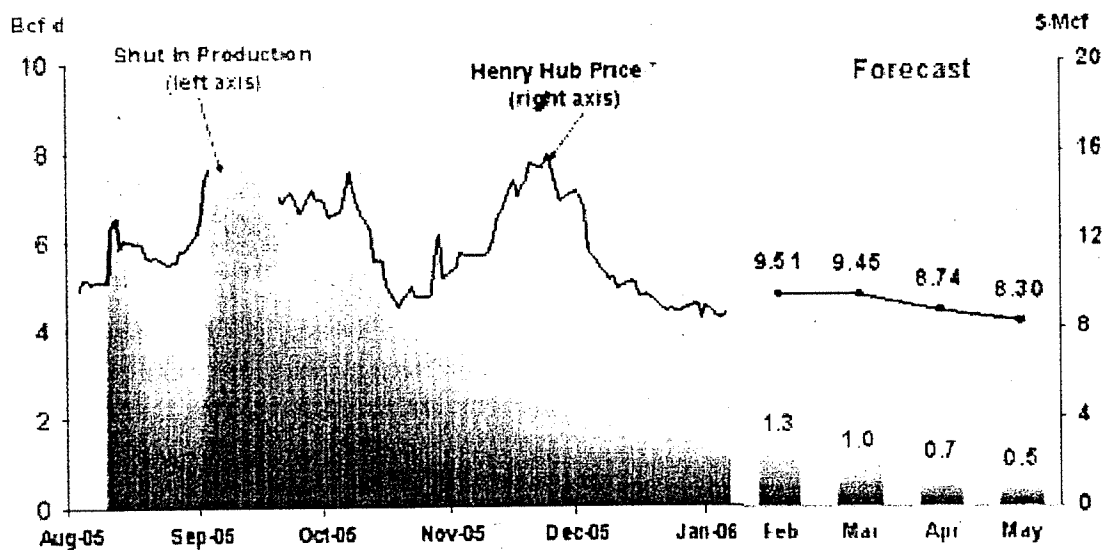


Source: Energy Information Administration, database.

- Notwithstanding the effects of recent hurricanes, supply and demand are now about where they were last year or two years ago (both down a little, with demand down more than supply) (see Exhibit ES-4).

### EXHIBIT ES-4: HURRICANES AND PRICES

Figure 5. Shut-In Federal Offshore Gulf Natural Gas Production



\* Trading of Henry Hub suspended from 9/23 - 10/6

Bcf/d = Billion cubic feet per day, \$/Mcf = Dollars per thousand cubic feet

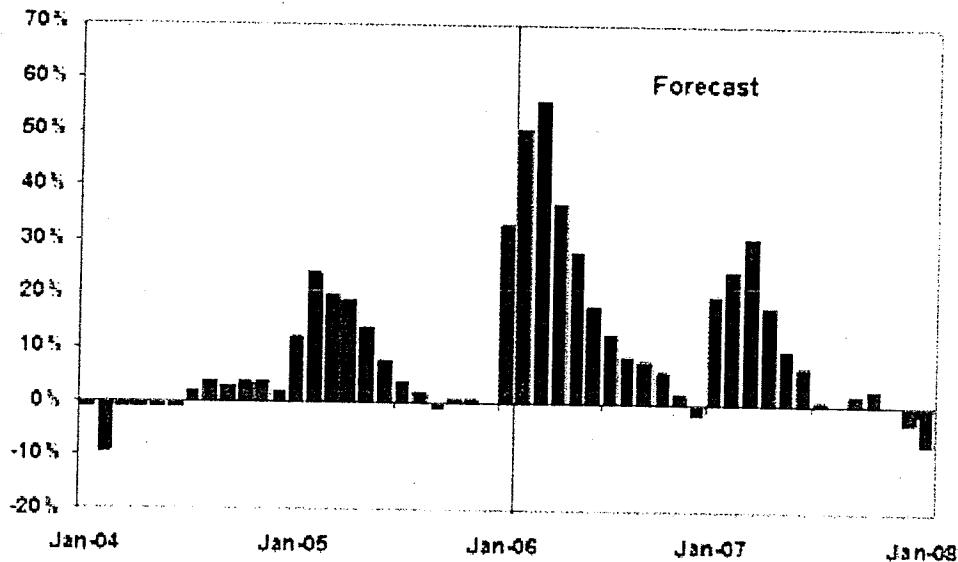
Short-Term Energy Outlook, February 2006



- Gas in storage is at or near record levels for this time of year, up over 50 percent compared to the last couple of years (see Exhibit ES-5).

#### EXHIBIT ES-5: DRAMATIC INCREASE IN STORAGE

Figure 12. U.S. Working Natural Gas in Storage  
(Percent Differences from Previous 5-Year Average)



Short-Term Energy Outlook, February 2006

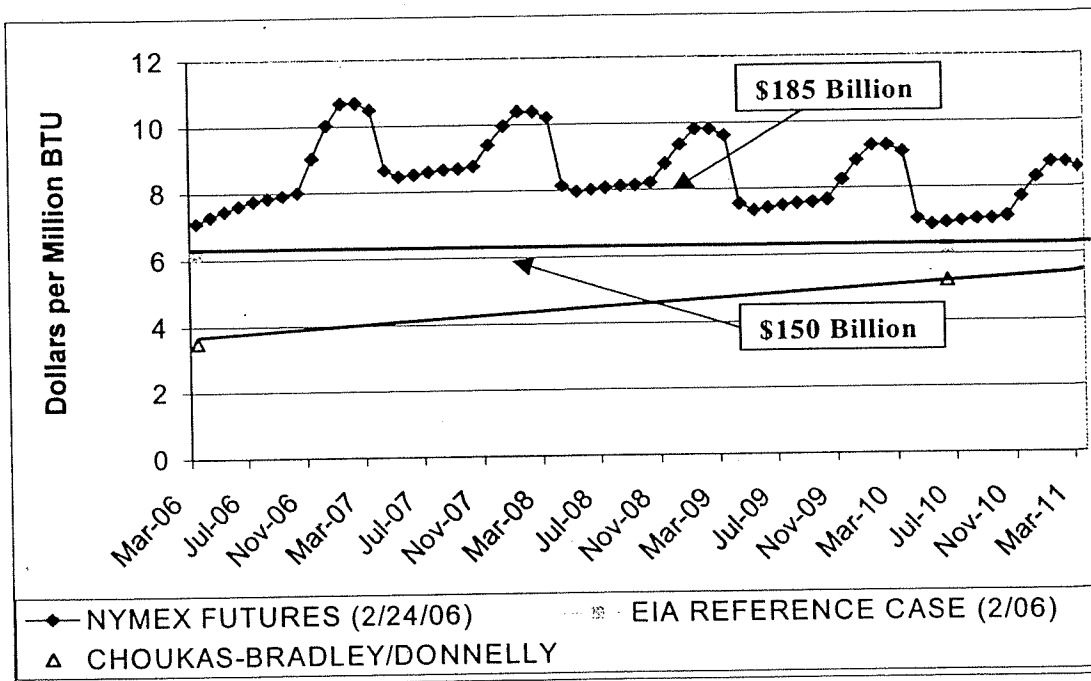


- Traditional supply and demand analysis would suggest that prices should be similar, or even a little lower than they were over the past two years, yet prices are running about \$3.00 higher, up over **60 percent** at the wellhead and in the spot market.
- Future prices are even higher still, running about 40 percent above current prices. They are about twice as high as the estimated long run costs of production.

Assurances that things will settle down three or four years in the future are cold comfort. A \$3.00 price difference costs consumers about **\$5 billion per month**. The massive increases in cash flow enjoyed by the industry in recent years have not been used to expand supply. Sluggish investment keeps supplies tight.

Exhibit ES-6 captures the essence of this concern by contrasting the February 2006 Energy Information Administration (EIA) natural gas projected prices (really production costs) with the futures prices for the next five years, at the settlement of the March 2006 contract

**EXHIBIT ES-6: PRODUCTION COSTS VS. SPOT PRICES**  
(Nominal Dollars)



Sources: NYMEX, 2/24 March 2006 settlement and Futures prices. Energy Information Administration, *Annual Energy Outlook: 200*, p. 155 for gas prices; p. 161 for price indices.

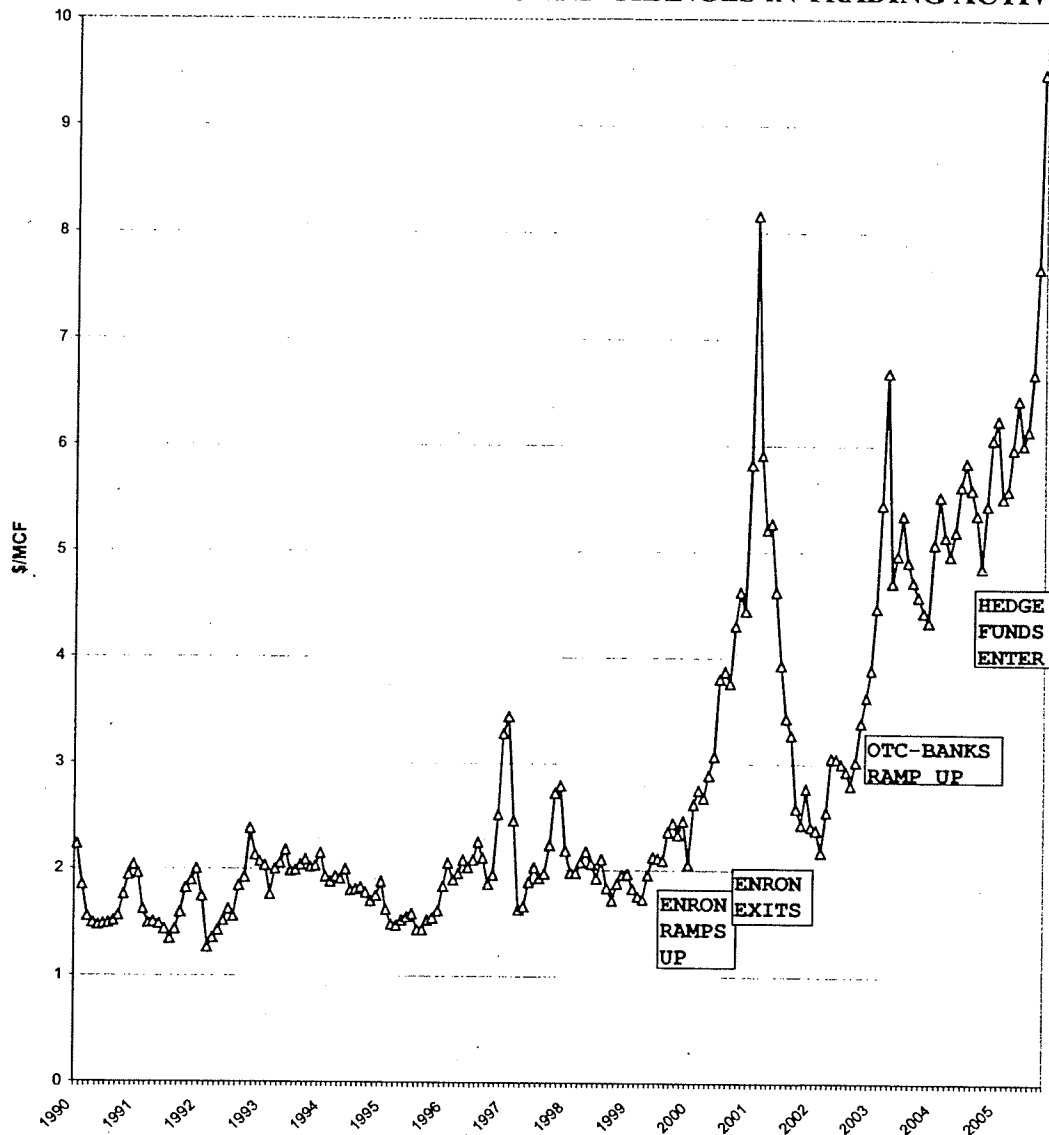
(February 24, 2006). Should the future prices become reality, there is a huge gap between those NYMEX prices and the underlying resource costs of about \$185 billion dollars over the five-year period. The stakes are just too high for policymakers to scratch their heads and say, we'll see. The EIA's projection of costs is actually well above other estimates. Thus, the stakes are in the hundreds of billions of dollars.

### FINANCIAL MARKETS COMPOUND THE PROBLEM

There is a striking correlation between large increases in trading and increases in the volatility and level of natural gas prices (see Exhibit ES-7). Each time trading ramps up, prices ramp up as well. There seems to be a roller coaster and a ratchet. Prices rise rapidly, then decline, but eventually come to rest at a steadily higher base price.

Natural gas trading takes place in unregulated, over-the-counter (OTC) markets and lightly regulated exchanges, like the New York Mercantile Exchange (NYMEX). The physical commodity is traded in some cases – cash transaction – but financial instruments called derivatives that do not involve the transfer of actual ownership of the underlying commodity have become very prominent. There are concerns about both the OTC and the NYMEX.

# EXHIBIT ES-7: WELLHEAD PRICES AND CHANGES IN TRADING ACTIVITY



Source: Energy Information Administration, *Natural Gas Database*.

There are several ways in which financial markets may be magnifying the upwardly volatile spiral of prices and contribute to the ratchet:

- Financial markets thrive on volatility and volume, but volatility and volume have costs. Producers of gas demand to be paid a higher premium to bring their gas to market sooner rather than later. Traders demand to be rewarded for the risks they incur, risks that are increased by the trading process itself.
- The influx of traders fuels volatility and raises concerns about abusive or manipulative trading practices.

Econometric analyses of the natural gas markets in recent years raise important questions as to how well the natural gas markets work. Given the uncertainty about the functioning of these markets, the claim that the market price is always “right” because it is the market price should be questioned:

- The economic analysis does not support the claim that these markets operate efficiently to establish prices.
- Risk premiums, which raise the price substantially (10 to 20 percent), are high and rising.
- Prices are well above the underlying costs of production.

The operation of financial markets is no accident. Trading reflects the rules that are established – by law and through self-organization. The most troubling aspect of natural gas trading is that policymakers really cannot decipher what goes on:

- The majority of transactions take place in markets that are largely unregulated.
- These over-the-counter markets, reported in unaudited, unregulated indices, are a major factor in setting the price of natural gas. And these unaudited, unregulated markets have behaved very poorly in recent years, with numerous instances of misreporting of prices.

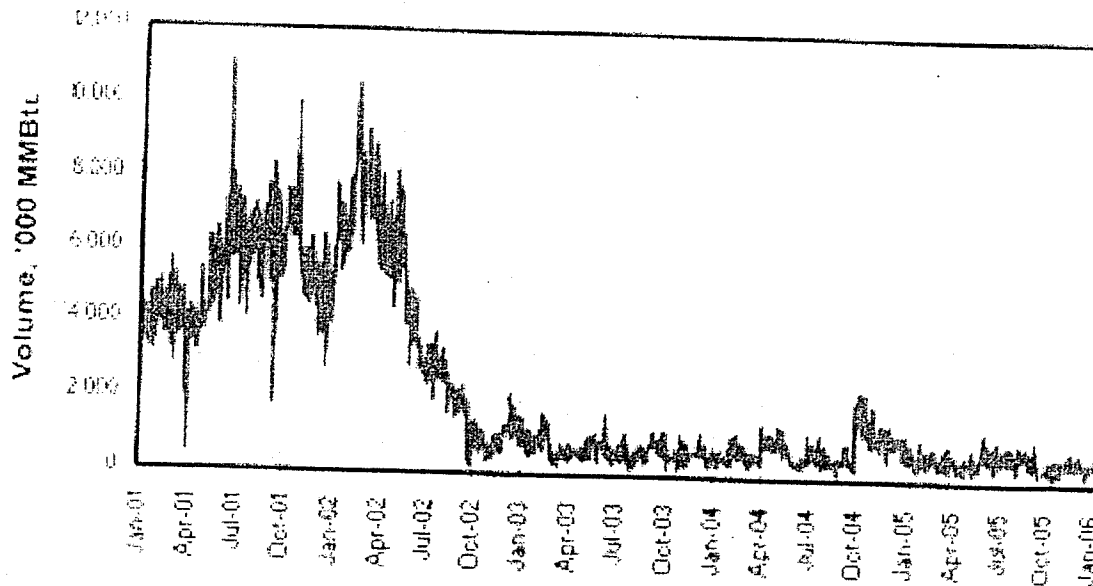
Even where there is light-handed regulation, the rules are inadequate to protect the public:

- A small number of large players can influence the price that consumers pay in a very short period of time and under circumstances that place the consumer at risk.
- Index prices are often based on a small number of self-reported transactions and there are no mechanisms for determining if such transactions represent an accurate sampling of the natural gas market. When even the hint of accountability was imposed by merely being asked to certify the veracity of reported transactions, traders stopped reporting (see Exhibit ES-8). The Exhibit below shows dramatically this phenomenon. The actual volume of trading did not dry up. Only the reporting of the volume did.

Thus, while some may be satisfied with recent market reforms and enforcement efforts, many others are not. The natural gas market lacks the most basic elements of transparency that are necessary to send proper price signals.

- The sad irony is that the markets for natural gas (a commodity which is a vital necessity for many Americans) are subject to far less regulation than most other commodities, most of which are far less crucial to consumers’ everyday lives. Most people can live without pork bellies, soybeans or orange juice; but they cannot live without natural gas for heating.

## EXHIBIT ES-8: GAS DAILY HENRY HUB REPORTED VOLUME



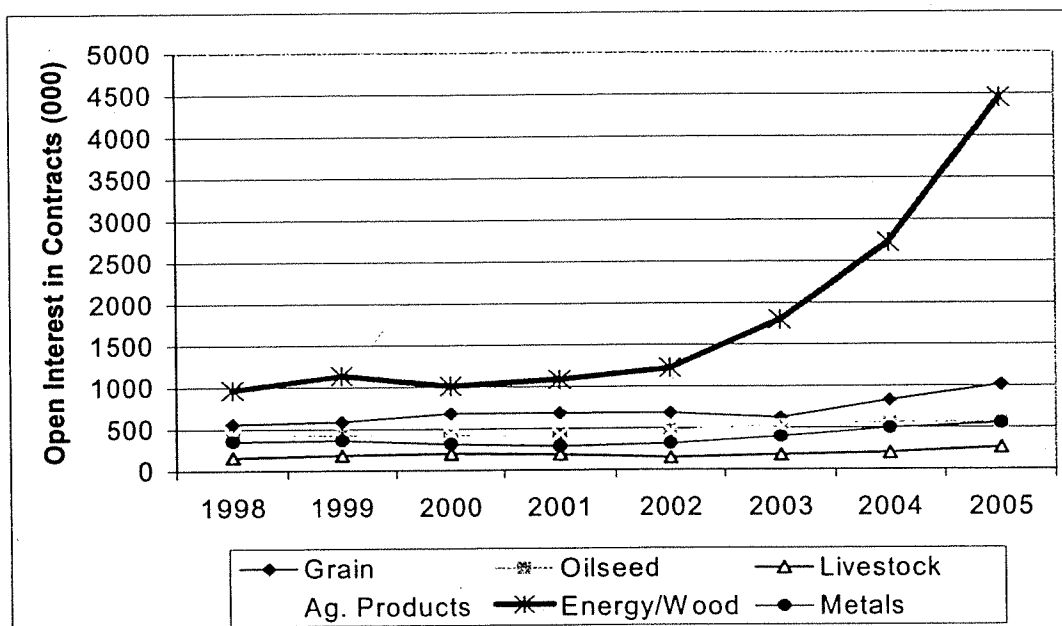
Source: Gas Daily.

Looking at the level of activity in the energy exchanges makes it hard to think that energy is just another ordinary commodity. The massive influx of traders and hedge funds has pumped up trading to astronomical levels. Exhibit ES-9 shows just the increase in the average number of open contracts (i.e. contracts entered into but not yet liquidated by an offsetting trade or physical delivery) at the end of the month over the past eight years. The remarkable growth in energy trading compared to other physical commodities is striking. Even this picture underestimates the increase in energy trading. The dollar value of these trades has increased much faster than the other commodities and off-exchange swaps for the agricultural commodities are restricted and much less common except in a very limited number of circumstances. In contrast, unregulated trading plays a very prominent role in natural gas markets.

### PUBLIC POLICY

While the story is complex, the bottom line is relatively simple. Things do not have to be this bad and the steps necessary to improve the situation do not involve the usual prescription about biting the bullet until the supply-side comes around. More can and should be done.

**EXHIBIT ES-9: COMMODITY TRADING OF NON-FINANCIAL INSTRUMENTS**  
**(Average Monthend Open Interest)**



Source: Commodity Future Trading Commission, Annual Reports: Futures Statistics by Major Commodity Group.

**Over-the-Counter market:** Unlike bankers and brokers in organized markets, traders in the over-the-counter market do not have to register or demonstrate their competence or good character. They do not have to report their holdings or positions. They can buy and sell this vital commodity/necessity with little capital or collateral to back up their promises. These markets need better oversight:

- Increased scrutiny could be achieved by requiring that traders in all the natural gas markets register and report their transaction and positions. Traders should be competent and not have a history of abusive trading.
- Natural gas traders should have the resources to meet their commitments and stand behind their trades, as bankers are required to do.
- Regulators should be able to see all markets so they can detect efforts to manipulate or exploit any individual market, including large transactions and large positions.

**Exchanges:** Even in organized exchanges where natural gas traders have to register, report and show financial and managerial competence, the rules are too lax. Market rules should discourage unproductive trading and be particularly on guard at moments of vulnerability in the natural gas markets:

- This can be accomplished by establishing reasonable limits on positions and ensuring that settlement periods are liquid and long.
- Vigorous oversight and stiff punishment of manipulation and abuse should be meted out swiftly.

Because state policy deals with local distribution utilities, it is difficult to drive change in the system from the buying end, where the primary concern is to make sure consumers have adequate gas to heat their homes. Nevertheless, there are certain measures that state governments can take to address the market concerns:

- States can create pressure for trading reforms by requiring their utilities to deal only with traders who are subject to oversight and who register, report and are audited.
- Mechanisms to promote long-term stability of commitments, transportation, storage and supply should be explored.
- States can also encourage utilities to be more aggressive in holding costs down, but the challenge is to find approaches that do so without exposing consumers to excessive risk.

The position of the major oil companies with large holdings of natural gas physical assets, dominance of natural gas marketing, and active involvement in natural gas financial markets poses a serious threat to consumers. Inadequate investment in exploration over the course of a decade or more contributed to the tight supply conditions. The massive windfall of cash flow in recent years dulls the incentive for the majors to supply gas to the market. They can keep it in the ground and hold out for higher prices. They are under no pressure to sign long-term contracts, except at extremely high prices. As major marketers and traders, they can move markets.

The fact that the majors straddle these markets, several of which are lightly regulated or entirely unregulated, compounds the problem, because their ability to profit by taking contrary positions in various markets is hidden from regulators. Policymakers must have the information necessary to make informed judgments about whether the major oil companies are exercising market power strategically in the long-term, and unfairly exploiting the tight markets they have helped to create in the short term.

A joint task force of federal and state antitrust and regulatory authorities should be formed to examine:

- the regional concentration of natural gas supplies;
- the behavior of the majors as marketers;
- behaviors of the major oil companies across all of the markets in which they are involved in physical as marketers, over-the-counter and in exchanges as traders.

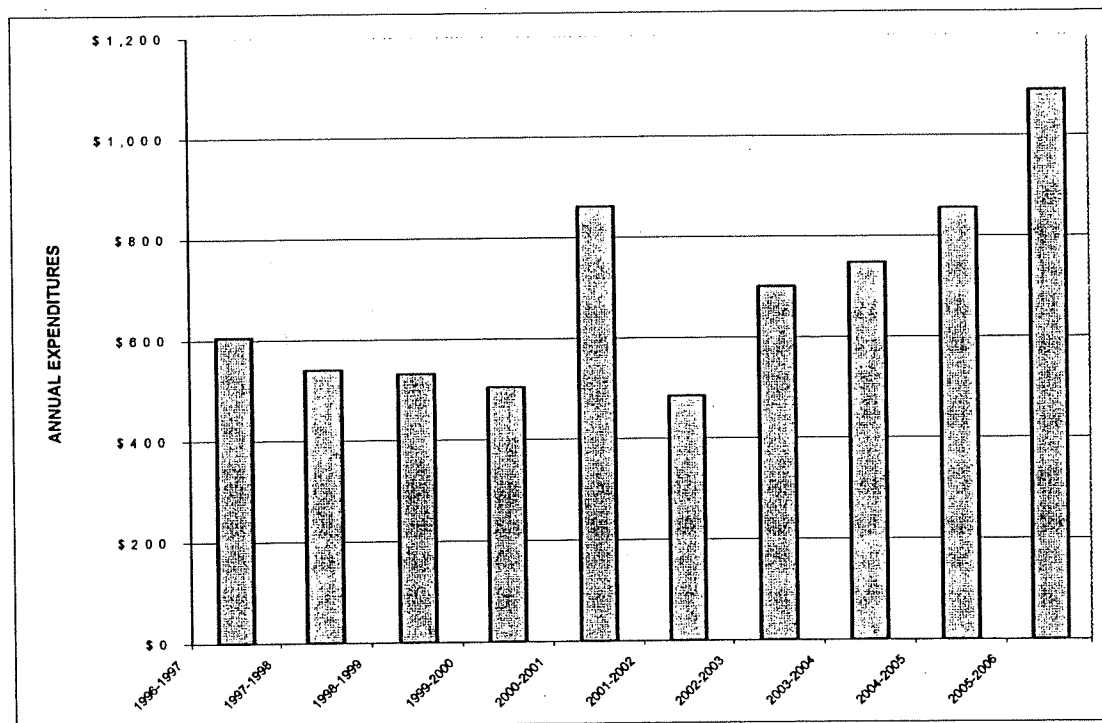
## I. HUGE STAKES IN A “WACKY” MARKET

### A. CAUSE FOR CONCERN

#### 1. A Staggering Burden

In February of 2006 the U.S. Department of Energy estimated that during the winter of 2005-2006 the typical household in the Midwest that heats with natural gas would face bills that would average about \$1100 (see Exhibit I-1). An extremely warm winter kept consumption lower than normal, but the increase in the typical bill is still about \$250 compared to the previous winter, and \$600 since the winter of 2001-2002.

EXHIBIT I-1: WINTER HEATING BILLS IN THE MIDWEST



Source: U.S. Energy Information Administration, *Annual Energy Outlook*, February 2006 and *Winter Heating Bills*, various issues.

Natural gas cost increases for agriculture and industry, where gas provides not only heat and hot water but is also used as an input and for processing, have been similar. The American Chemical Council, representing the “largest industrial user of natural gas,”<sup>1</sup> expressed

concern about the sharply rising price of natural gas... Natural gas prices “were sky-high before the storms” – more than doubling since May and up six-fold in the last five to six years. Since the hurricanes, they are up 67%. The U.S. price is the highest in the industrialized world – more than \$12/MMBtu [as of late September] and five to ten times the price in some other countries. “U.S. manufacturers simply cannot compete in the global market when the price of a key input is so much higher here.”<sup>2</sup>

The impact of the cost increases at the household and business levels has been devastating, but the aggregate sums are even more staggering. In the six years since the turn of the century (2000-2005) the wellhead price of natural gas is up by \$400 billion compared to the prior six years (1994-1999). Unlike petroleum products, where a significant part (about 50 percent) of any price increase goes to foreign raw material owners, the overwhelming majority (about 85 percent) of natural gas price increases goes to domestic companies.

## **2. Wacky, Strange, Odd, Erratic Prices**

Prices are not only high; they are also

- “a disaster... a bit of a Gong show,” September 23, 2005,<sup>3</sup>
- “out of control,” November 18, 2005,<sup>4</sup>
- “unusual,” November 30, 2005,<sup>5</sup>
- “wacky,” January 25, 2006;<sup>6</sup>
- “frenetic,” February 6, 2006<sup>7</sup>
- “strange,” February 14, 2005;<sup>8</sup>
- “a roller coaster,” February 21, 2006.<sup>9</sup>

While these descriptions in the popular and trade press are striking, the fact that regulators with responsibility for oversight of various parts of the industry described pricing as “odd” and “erratic” at the winter meeting of the National Association of Regulatory Utility Commissioners is a source of even greater concern.<sup>10</sup> Indeed, “the unusual set of circumstances has made it particularly hard for FERC [Federal Energy Regulatory Commission] analysts to draw a clear picture of how markets are truly behaving – and why.”<sup>11</sup>

*Energy Daily* described the pricing patterns that were the source of these observations as follows:

Several weeks of unseasonably warm weather have left large amounts of gas stockpiled in U.S. reservoirs, pushing prices steadily down to an average of \$8.85 per mmBtu during the second week of January.

According to officials at the Federal Energy Regulatory Commission (FERC) however, that is probably as low as prices will go in the short term.

If true, that would produce an uncommon pattern: gas prices bottoming out in the peak of winter – when gas demand is usually highest for heating – and rising slightly with the approach of spring, typically a period of very low natural gas prices....

Even if gas prices remain soft throughout the winter, however, customers may see only limited benefits from the surprisingly soft gas prices.<sup>12</sup>

From the consumer point of view, the wackiest aspect of \$8.85 gas may not be the inversion of winter/spring prices or the lock-in of high prices through hedging, but the fact that \$8.85 is considered a “soft” price. Even the continuing decline of spot prices to around \$7.00 by mid-February did not really eliminate the consternation. Just four years earlier January gas was selling for about \$2.25 per thousand cubic feet (mcf). An additional source of consternation stems from the fact that in the middle of December 2005, the Energy Information Administration (EIA) had revised its estimate for the production cost of gas upward to about \$5.50 per million British thermal units (mmBtu).

EIA’s estimate, which is considerably higher than the \$4.50 estimates of others,<sup>13</sup> suggests that a massive premium, above the full cycle resource costs of production, is being paid for gas. Even more troubling from the consumer point of view is the fact that futures prices are well above the “soft” spot prices (see Exhibit I-2). March 2007 and 2008 prices are over \$10.00, twice the cost of production. Hundreds of billions of dollars are at stake.

There should be little surprise, then, that the public urgently wants an answer to a simple question –

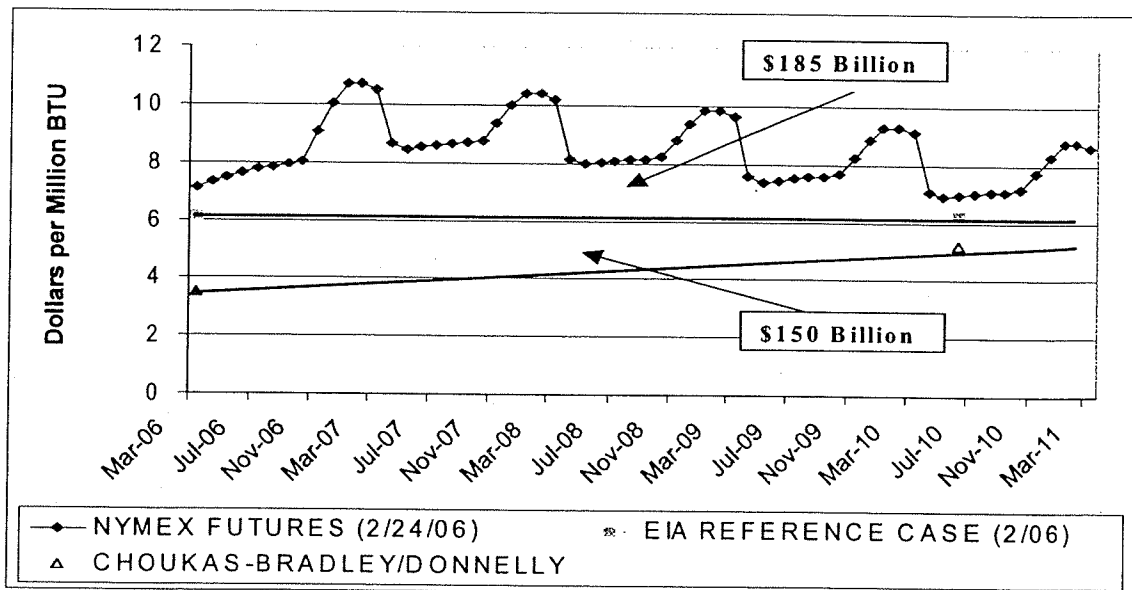
**How did this happen?**

## **B. A COMPLEX SPIRAL OF PRICE INCREASES**

Whenever natural gas prices spike, the major players start pointing fingers. The large oil companies report huge profits and receive a great deal of attention. Tightness in the physical market is blamed. The easiest way for all parties to avoid responsibility is to invoke Mother Nature – the weather and geology.

- Demand is soaring<sup>14</sup> or skyrocketing.<sup>15</sup>
- Supply is constrained by nature and public policy.<sup>16</sup>
- Financial markets send efficient price signals to balance supply and demand.<sup>17</sup>

**EXHIBIT I-2: PRODUCTION COSTS VS. SPOT PRICES**  
(Nominal Dollars)



Sources: NYMEX, 2/24 March 2006 settlement and Futures prices. Energy Information Administration, *Annual Energy Outlook: 200*, p. 155 for gas prices; p. 161 for price indices.

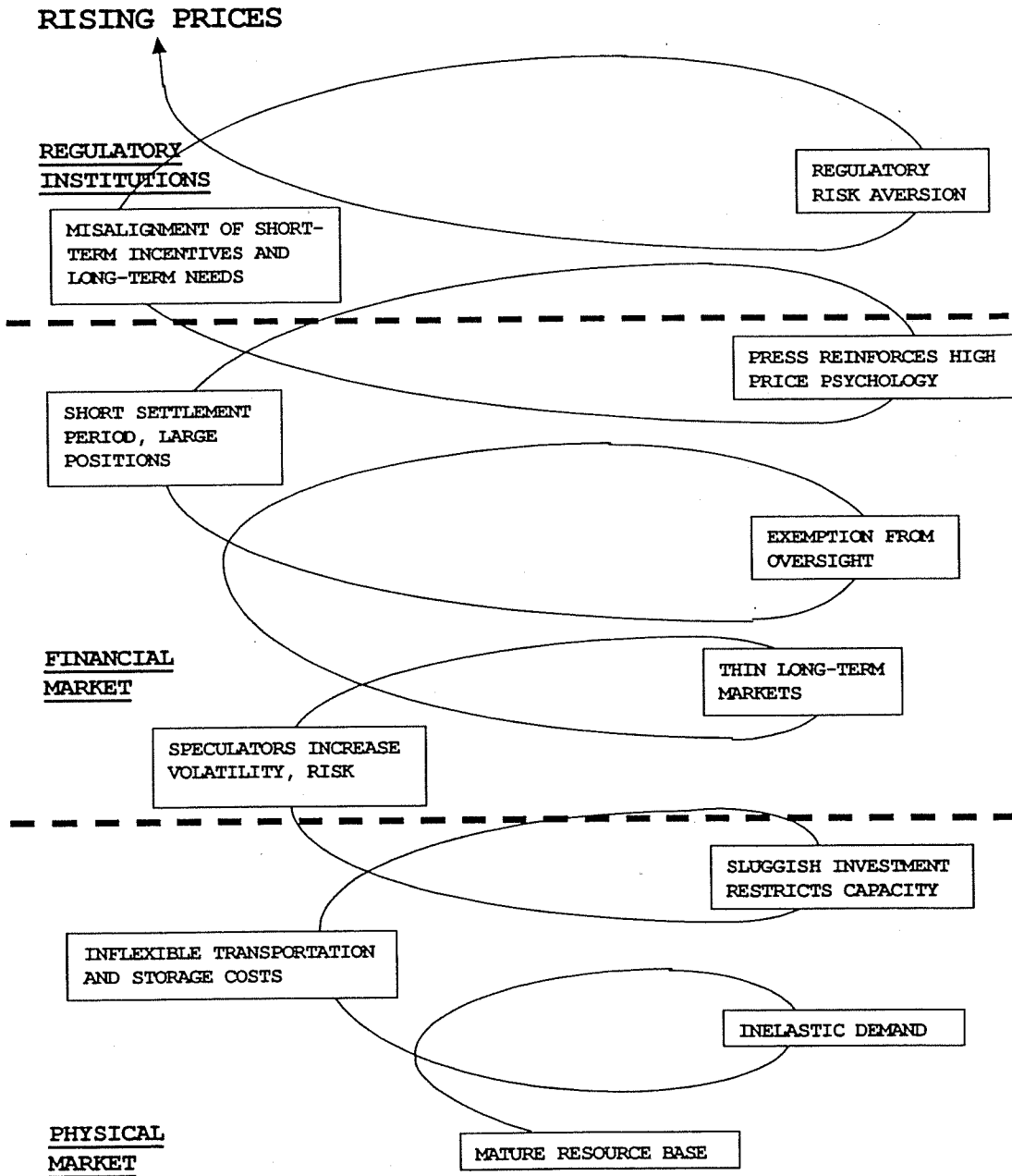
**This is a simple story, often told by regulators and in the popular press that is, less than half true.** The reality is that a complex spiral of factors has been driving prices to unprecedented and unjustified levels (see Exhibit I-3).

### 1. Physical Market Fundamentals

Weather certainly affects this market – winter cold, summer heat, hurricanes – but in the past year careful analysis indicates that the weather’s divergent effects have largely cancelled each other out. This conclusion stands in stark contrast to news reports that have greatly over-hyped the weather’s impact on prices.

- Demand is not surging by any stretch of the imagination. For the past decade, it has been relatively flat.
- The hurricanes that reduced production capacity in the Gulf region, for instance, also shuttered demand, so the loss to the market was smaller than anticipated. Moreover, mild weather in the rest of the country kept demand down, so storage was high and the net available supply had not been sharply reduced. This was clear to anyone who was paying careful attention almost immediately after the events took place.

### EXHIBIT I-3: CAUSES OF SPIRALING NATURAL GAS PRICES



Weather can only be a small part of the problem.

Supply is just part of the problem. While it is true that the natural gas resource base is mature, this is more of an excuse than an explanation. In fact, the resource base is stable and the supply-side fundamentals are not consistent with current high prices.

With slowly growing demand, a well functioning market should adapt smoothly. There is no clear picture or consensus on what the production cost of natural gas is in the long term, but it is certainly nowhere near the levels that have been charged at the wellhead in recent months. Moreover, to the extent that production capacity has been tightening, that is not solely the result of geology. It also reflects investment decisions.

## **2. Financial Commodity Markets**

Thus, the story on fundamentals is a lot more complex, and troubling, than the simple “tightness” refrain would suggest. But if physical tightness is not a sufficient answer, what else is driving prices up? There is growing concern that a second culprit, the financial commodity trading markets, may be contributing to high and volatile energy prices.

The *New York Times*, in a recent front-page Business Section article entitled “Energy Trading, Without a Certain E,”<sup>18</sup> described the current activities of energy hedge funds against the backdrop of the impending Enron trials, noting that “some industry officials question whether the funds are contributing to higher energy prices, or at least stoking more price volatility.”<sup>19</sup>

While the “E” in the *New York Times* headline was intended to refer to Enron, which is gone but for a few pending fraud trials, it actually could stand for two more important “Es,” energy or equity. Huge sums of energy futures contracts are traded without being backed by the underlying assets or equity. Because there are few requirements for backing, entry is extremely easy and trading can escalate rapidly. There has been a stampede of traders into energy markets. As more and more traders and huge sums of money enter the market, there is a concern that the price may be bid up, as suggested by the *New York Times*:

But with the revival comes questions from some financial market analysts about whether energy trading will be better able to withstand another potential meltdown... The latest ramp-up in trading has also been marked by an air of secrecy underscored by the proliferation of hundreds of hedge funds that are speculating on everything from crude oil to electricity in both regulated and unregulated markets. Many funds are being aided by investment from banks, which are also buying up distressed power plants and other remnants of the collapsed sector.<sup>20</sup>

A debate continues to rage about whether the hedge funds are contributing to higher energy prices. The hedge funds are borrowing as much as 10 times what they invest in some trades, analysts and traders say, contributing to short term

volatility that has complicated the energy purchases of many large energy users.<sup>21</sup>

This quote suggests the complexities of natural gas financial markets. First, large quantities of natural gas are traded in two kinds of markets: over-the-counter (OTC) and on exchanges. “The OTC market refers to a collection of traders, brokers, and other market participants which are interested in a given commodity, security, or derivative, and trade it among themselves and not on an exchange.”<sup>22</sup> The OTC market is unregulated. The exchanges are regulated, but many believe that regulation is too lax.

Second, the juxtaposition of hedge funds and large users highlight the distinction between financial instruments (known as derivatives) and the physical commodity. A derivative is “a financial instrument, traded on or off an exchange,” that involves “the trading of rights or obligations based on the underlying product, but do not directly transfer property.”<sup>23</sup>

Third, the quote also highlights the essential characteristic of derivatives. “Unlike their respective underlying commodities... however, derivatives are sometimes preferred as a trading tool for their leveraging capability. Leverage, in financial terms, is the effect of magnifying the outcome of an investment through the use of borrowed funds (credit).”<sup>24</sup>

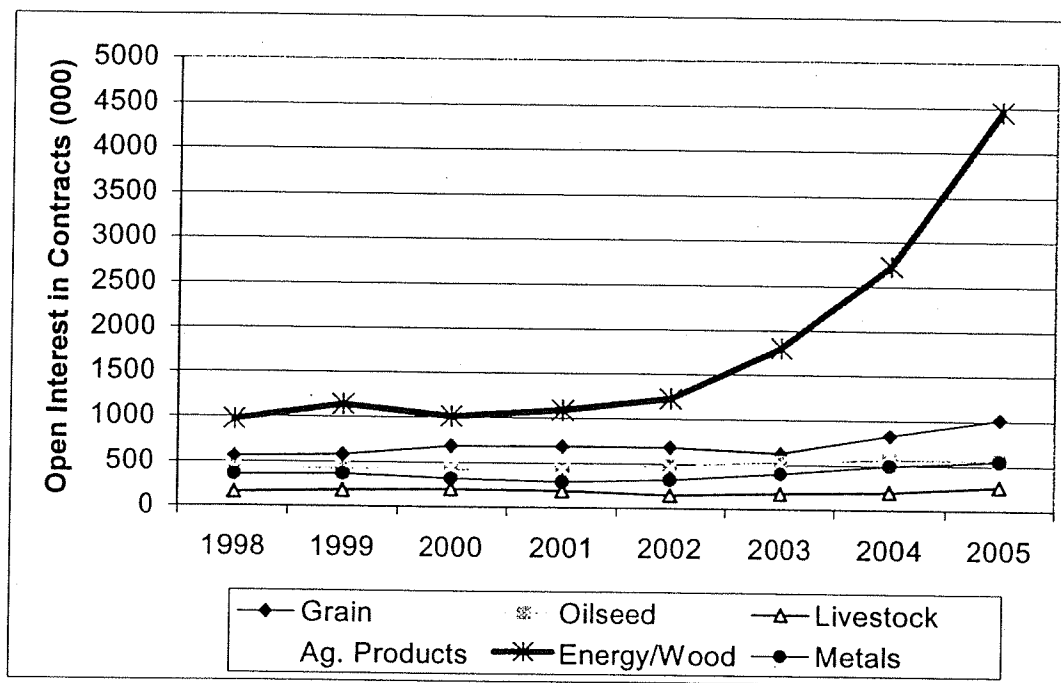
Throughout this analysis the term “financial markets” is used to cover this broad range of markets, transactions and issues. There are policy issues and concerns swirling around exchanges and over-the-counter market, as well as derivatives and the reporting of cash market transaction.

The uniqueness of energy commodity markets can be readily seen in the astronomical level of financial activity that has taken place in these markets (see Exhibit I-4). Month-end open interest contracts as shown in the Exhibit are futures contracts at the end of the month that have been entered into but not liquidated by an offsetting transaction. The amount of open interest in futures on energy at U.S. futures markets (measured in the number of contracts) increased by about 3 million between 2002 and 2005. For all the other non-financial commodities, the increase was just over 1 million.

Even this comparison significantly underestimates the magnitude of the increase in commodity market activity in energies. The dollar value of these energy futures contracts has increased much more rapidly than for other commodities. Moreover, while the off-exchange (or over-the-counter) trading in agricultural derivatives is not significant, that for energy derivatives is.

There are so many plots and subplots in a multitude of settings that it is difficult to present a simple story or know where to begin. We state the obvious when we observe that the physical markets are tight and the financial commodity markets are extremely upwardly volatile. Some people hear the first part – tight physical markets – others hear the second part – volatile financial commodity markets. The real danger may lie in the intersection of the two.

**EXHIBIT I-4: COMMODITY TRADING OF NON-FINANCIAL INSTRUMENTS  
(Average Month-end Open Interest)**



Source: Commodity Future Trading Commission, Annual Reports: Futures Statistics by Major Commodity Group.

In the past six years just about everything that could go wrong in the natural gas market has gone wrong.

### C. WHERE TO LOOK FOR ANSWERS

If the complex spiral of natural gas is the right explanation, then the policy response will have to be complex as well. While policymakers cannot do anything about the weather, they can certainly attempt to build systems that are less vulnerable to and mitigate the impact of uncontrollable events. Physical market and financial market policies that dampen price increases can and should be implemented.

Behind the headlines of high-energy bills and the roller coaster of natural gas prices lies a complex story that is largely hidden from public view. The main action plays out on two large, national stages: the physical market and the financial commodity markets.

When we look for answers, we end up in Washington, D.C. Jurisdiction over the wholesale natural gas system lies squarely in the nation's capitol. Both major determinants of the wildly spiraling price of gas, the physical (wellhead and pipeline) markets and the

financial commodity markets, are under federal authority and that is where the opportunity for fashioning the most critical policies lies.

The state regulatory arena plays a lesser but nonetheless important role because the behavior of utilities, who purchase large quantities of gas for their customers, is influenced by regulatory policy.

Asking the hard questions in Washington does not yield good answers, however, because much of the wholesale natural gas industry is lightly regulated or not regulated at all. Close examination of price behavior and econometric analysis of natural gas market performance suggest that we have no real grasp on how these markets work and a lot of evidence that they are dysfunctional. We certainly do not have the most elementary data on who is playing in the market and how it is being played. The vast majority of energy trading is conducted under circumstances that keep policymakers and regulators in the dark. Thus, regulators cannot answer the most basic questions.

Who is trading and how much?

What are they doing?

What should they be doing?

What should they not be doing?

#### **D. APPROACH AND OUTLINE**

Physical market issues tend to receive the greatest attention because consumers see the prices in their monthly bill and the big oil companies, who produce most of our natural gas, post their profits on a quarterly basis. The financial commodity markets receive much less attention because their construction and execution are hard to grasp, while much of their operations are shrouded in secrecy. Many of these players do not have to report their profits publicly and the way these markets affect consumers' energy bills is indirect, although substantial.

When oil companies report profits that are likely to exceed \$100 billion this year, it will receive front-page headlines, as past reports of record profits have. But when the commodity market trading shop of a single bank reported a bonus pool for 2005 of \$11 billion, the story was buried deep in the business section (if it was reported at all). When hundreds of completely unregulated hedge funds trade hundreds of billions of dollars (perhaps as much as a trillion dollars) of natural gas futures, without ever taking delivery of a single molecule of natural gas, it deserves some attention too, but this activity is hidden behind a veil of secrecy in unregulated hedge funds and trading in over-the-counter derivatives markets. Natural gas may be traded over 30 times before it is consumed (i.e. the volume of trading

exceeds the volume consumed by 30 times), fueling the suspicion that this trading drives up transaction costs and increases volatility.

Therefore, this analysis flips the emphasis around. It views the current situation in natural gas markets and energy markets in general through the lens of change in financial commodity markets. In taking this view, three things are eye catching:

- As noted, although trillions of dollars of transactions take place in these markets, they are largely unregulated in the over-the-counter markets; receiving little regulatory scrutiny, detailed attention in the press, or extensive analysis in academic literature.
- The escalation of trading activity coincides with not only the increase in volatility, but also the upward movement of prices.
- For natural gas these markets are of very recent origin and have a troubled, history. Trading in natural gas futures on the New York Mercantile Exchange (NYMEX), which has become the most influential exchange of its kind, began in early 1990. Large over-the-counter (OTC) trading, ushered in by Enron, began in earnest in 2000, rapidly spun out of control, and quickly crashed. After a period of calm, trading and prices took off again.

The analysis proceeds as follows:

Section II briefly describes the nature of the physical commodity and the fundamentals of the physical market as the context for the operation of the financial markets. The basic characteristics of the commodity affect the nature of its production, distribution and use, as well as set the context for financial markets. It begins by discussing the characteristics that make energy commodities vulnerable to price spikes, exploitation and manipulation. It shows that demand has been steady, but investment in supply has been sluggish. Examining estimates and projections of the cost of production, it finds that the current prices are well above long-run economic costs. It also demonstrates that the current short-run supply situation does not justify the high prices. In sum, while the tight supply-demand situation accounts for some of the recent increases in price, prices are far above where the physical fundamentals suggest they should be.

Section III examines the movement of natural gas prices in the financial markets. It recounts the history of natural gas prices over the last decade and a half, pointing out the coincidence between prices, trading, and public policy decisions. It describes this history in two acts. The first covers the period from the beginning of natural gas trading through the collapse of Enron. The second covers the resurgence of commodity trading after a period of post-Enron quiet. The massive abuse of the Enron era is gone (we hope) but prices are still “wacky.” Recent experience suggests that problems in the natural gas market persist, beyond the fraud that occurred during the Enron period. The section then discusses factors that may move prices in natural gas markets.

Section IV presents a discussion of uncertainties and doubts about the behavior of natural gas markets based on academic and trade analyses. It reviews general, theoretical concerns, as well as the academic literature of concerns about financial markets. It concludes with an examination of anecdotal and academic evidence of anomalies in the natural gas market.

Finally, Section V offers recommendations for policy-oriented examination and reform of natural gas market.

## ENDNOTES

- <sup>1</sup> Foster Report, No. 2560, September 29, 2005, p. 5).
- <sup>2</sup> Id.
- <sup>3</sup> Platts, *Gas Daily*, September 23, 2005, p.
- <sup>4</sup> Platts *Gas Daily*, November 18, 2005, p. 2.
- <sup>5</sup> Chernoff, Harry, "Unusual Signals form the Natural Gas Markets, *Energy Pulse*, November 30, 2005.
- <sup>6</sup> Beattie, Jeff, "Warm Winter Brings Wacky Price Pattern to Natural Gas Market," *Energy Daily*, January 25; see also Platts *Gas Daily*, February 14, 2006, p. 2.
- <sup>7</sup> Platts, *Gas Daily*, February 6, 2006.
- <sup>8</sup> Platts, *Gas Daily*, February 14, 2006, p. 3.
- <sup>9</sup> *Wall Street Journal*, February 21, 2005, p. C-1; see also Platts, *Gas Daily*, February 6, 2006, p. 2.
- <sup>10</sup> Beattie, "Wacky," p. 1.
- <sup>11</sup> Platts *Gas Daily*, February 14, 2006, p. 3.
- <sup>12</sup> Beattie, "Wacky," pp. 1...4.
- <sup>13</sup> Energy Information Administration, *Annual Energy Outlook: 2006*, February 2006; Choukas-Bradley, James R. and Michael Donnelly, *A Report on Projected Natural Gas Prices and Dynamics of the Natural Gas Market for 2005 and Beyond*, February 11, 2005.
- <sup>14</sup> David J. Lynch, "Natural Gas Treads a Global Path: USA's Soaring Use Means Growing Reliance on Imports – which, If Handled Well, Could Mean Lower Prices," *USA Today*, December 20, 2005, A-1.
- <sup>15</sup> Fischer, Ben, "Fueling the Fire," *Wisconsin State Journal*, February 12, 2006, p. C-6.
- <sup>16</sup> Federal Energy Regulatory Commission, *High Natural Gas Prices: The Basics*, February 1, 2006.
- <sup>17</sup> Brown-Hruska, Sharon, *Crisis Regulation: Reacting to High Energy Prices*, before the University of Houston Global Energy Management Institute, January 26, 2006.
- <sup>18</sup> Alexei Barrionuevo, "Energy Trading, Without a Certain 'E'," *New York Times*, January 15, 2005, p. 3-3.
- <sup>19</sup> Id., p. 3-3.
- <sup>20</sup> Barrionuevo, "Energy Trading," p. 3-3.
- <sup>21</sup> Id., p. 3-3.
- <sup>22</sup> Sturm, Fletcher J., *Trading Natural Gas* (Tulsa: PennWell Publishing Company, 1997).
- <sup>23</sup> Commodity Futures Trading Commission, *A Glossary*.
- <sup>24</sup> Sturm, p. 31.